

Data Mining Application In Effective Knowledge Management: An Empirical Study

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ABSTRACT

Data mining is a process that involves the use of advanced analytical techniques to discover patterns and relationships in data. It has been widely applied in various fields, including knowledge management, to extract useful information from large data sets and support decision making. Effective knowledge management is critical for organizations to stay competitive and achieve their goals. It involves the creation, capture, sharing, and use of knowledge within an organization. Data mining can play a significant role in supporting effective knowledge management by enabling organizations to discover hidden knowledge and relationships in their data and use it to inform their decision making. Data mining is the application of statistical analysis, data visualization, and database management to discover patterns in large data sets involving human behavior and activities. Data mining can be used for many purposes, including the identification of fraudulent transactions in a credit card

processing system or the recognition of abnormal cell growths in breast cancer screening. In addition to helping businesses improve their operations, data mining is also useful in scientific research applications; for example, a researcher might use data mining to identify genes that correlate with certain diseases.

Data mining is also known as predictive analytics. Data mining is one part of the broader field of knowledge discovery from databases (KDD). KDD can be divided into three main steps: pre-processing, model building, and post-processing. To get results from these steps, you need to develop a good understanding of your data and how you want to analyze it. This empirical study aims to examine the application of data mining in effective knowledge management and its impact on organizational performance. In the present study 195 people from different occupational sectors were surveyed to explore Data Mining Application in Effective Knowledge Management. The study concludes that there is a significant importance of Data Mining Application in Effective Knowledge Management.

INTRODUCTION

Data mining is the process of extracting useful and previously unknown information from large datasets. It is a key step in the knowledge discovery in databases process and is a significant subfield of knowledge management. Data mining involves analysing large datasets to identify patterns and trends that can be used to make informed decisions.

It is often used in business and finance, marketing, healthcare, and other industries to gain insights from data and improve operations. Data mining involves a variety of techniques, including machine learning algorithms, statistical analysis, and visualization tools, to extract and analyze data from various sources. It involves several steps, including data preparation, feature selection, model building, and evaluation. The techniques for analysis may involve from bivariate to multivariate (Srivastav & Mittal, 2021; Paul et al., 2016).

Data mining can be used to identify trends, predict future outcomes, and make informed decisions based on data (Shaw, Subramaniam, Tan, & Welge, 2001). It can also be used to identify hidden relationships and patterns in data, which can be useful for a wide range of applications, such as identifying fraudulent activity, analysing customer behaviour, and optimizing business processes. Data mining is an important tool for extracting valuable insights from large datasets and is a key component of the knowledge discovery in databases process. It is a valuable tool for businesses and organizations looking to make informed decisions based on data and improve their operations. In the realm of knowledge management, data mining can play a crucial role in helping organizations effectively manage and use their knowledge resources. By analysing data from various sources, such as databases, documents, and social media, organizations can gain insights into the types of knowledge that are most valuable to their operations and the ways in which knowledge is being used and shared within the organization. Use of data mining for knowledge

management is the ability to identify areas where knowledge is lacking or where there is a need for more information. By analysing data on the types of knowledge that are being accessed and used, organizations can identify areas where there is a need for more in-depth knowledge or where there are gaps in understanding (Silwattananusarn & Tuamsuk, 2012). This can help organizations focus their efforts on acquiring or creating new knowledge in these areas. **Figure 1** presents the applications of data mining in knowledge management:

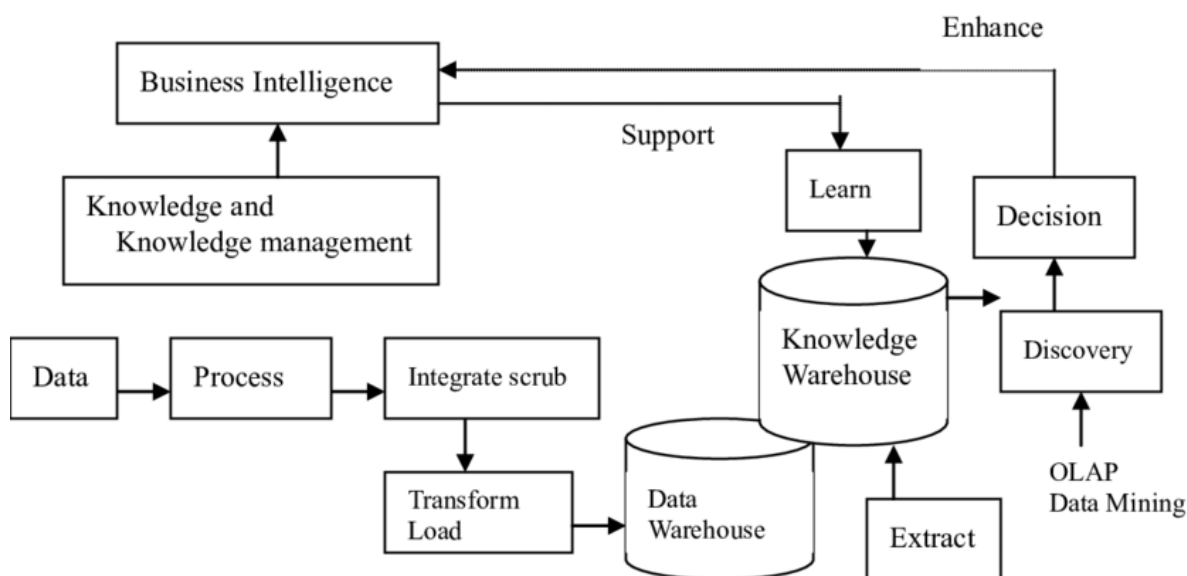


Figure 1 Data mining applications in Knowledge Management

Source: Lee, 2009

Data mining can also help organizations identify the most effective ways to share knowledge within the organization. By analysing data on how knowledge is being accessed and used, organizations can identify the most effective channels and methods for sharing knowledge, such as through training programs, collaboration tools, or knowledge management systems. In addition to identifying areas where knowledge is lacking and the most effective ways to share knowledge, data mining can also help organizations understand how knowledge is being used to solve problems and drive innovation. By analyzing data on the types of knowledge that are being accessed and used in different contexts, organizations can identify the types of knowledge that are most valuable for driving innovation and solving problems.

Literature review

Data mining is a process of analysing and extracting valuable insights from large datasets. It is a powerful tool that has gained significant prominence in various fields, including business, healthcare, and finance. Data mining involves the use of advanced algorithms and techniques to identify patterns and relationships in data that may not be immediately apparent. (Ur-

Rahman & Harding, 2012) These patterns and relationships can then be used to make predictions and inform decision-making. One of the key benefits of data mining is its ability to handle large volumes of data. With the increasing amount of data being generated by businesses and organizations, data mining allows for efficient and effective analysis of this information. Knowledge management is an essential aspect of any successful business. By effectively managing knowledge, companies can tap into a valuable resource that can drive innovation, increase efficiency, and improve decision-making. However, knowledge is not always easy to manage, especially since it can be an expensive commodity. That is why it is important for businesses to have a clear understanding of the different types of knowledge and how to effectively utilize them. There are two types of knowledge: explicit and tacit. Explicit knowledge is knowledge that is easily expressible and can be codified in written or oral form. This type of knowledge includes things like manuals, policies, procedures, and written documents. (Heinrichs & Lim, 2003) Explicit knowledge is important because it provides a clear understanding of how things work and can be easily shared with others. Tacit knowledge, on the other hand, is more complex and difficult to express. It is often referred to as "know-how" and includes things like skills, expertise, and experience. Tacit knowledge is typically more difficult to codify and share with others, but it can be a valuable resource for companies. For example, a team of engineers with a wealth of experience in a particular field may be able to solve problems and make decisions more effectively than a team without that experience.

To ensure that knowledge is a valuable asset for the company, it is important to properly manage it. This involves recognizing the value of both explicit and tacit knowledge and finding ways to effectively utilize them. One way to do this is by implementing a knowledge management system that allows for the sharing and dissemination of both types of knowledge. This could include things like training programs, knowledge-sharing platforms, and mentorship programs. In addition to managing knowledge effectively, it is also important to continuously invest in it. (Ranjan & Bhatnagar, 2011) This could involve investing in employee training and development, encouraging ongoing learning and professional development, and staying up-to-date with industry trends and advancements. By investing in knowledge, companies can stay competitive and continue to grow and evolve.

In today's digital age, data is being generated at an unprecedented rate. Organizations of all sizes are collecting vast amounts of data from a variety of sources, including social media, customer transactions, and sensor networks. While this data can be extremely valuable, it can also be overwhelming and difficult to process. This is where data mining tools come in.

Data mining is the ability to uncover hidden knowledge. With traditional data analysis techniques, it can be difficult to identify trends and patterns that are not immediately obvious. However, data mining tools are specifically designed to identify patterns and relationships that may be hidden within the data. This can help organizations to uncover insights that may not have been visible using traditional analysis techniques.

For example, a retail organization may use data mining to identify patterns in customer purchasing habits. By analyzing data on customer purchases, the organization may be able to identify trends that suggest certain products are more popular among certain demographics or at certain times of the year. This information could be used to inform marketing and sales strategies, as well as product development and inventory management.

Another example of how data mining can uncover hidden knowledge is in the healthcare industry.(Wang & Wang, 2008) By analyzing data on patient records, healthcare organizations can identify patterns that may suggest potential health issues or predict the likelihood of certain conditions occurring. This information could be used to inform the development of personalized treatment plans and improve patient outcomes.

There are a variety of data mining tools available, ranging from simple spreadsheet software to more complex software packages that use advanced algorithms to analyze data. Some of the most popular data mining tools include R, Python, and KNIME.

While data mining can be an effective way to uncover hidden knowledge, it is important to use these tools responsibly. Data mining can raise privacy and ethical concerns, as it involves analyzing large amounts of personal data. It is important for organizations to have clear policies in place to ensure that data is used ethically and in accordance with relevant laws and regulations. Knowledge management (KM) is a strategic approach to managing an organization's knowledge assets in order to improve efficiency, innovation, and decision-making. KM implementations are driven by the use of information and communication technologies (ICTs) that assist with knowledge acquisition/creation, dissemination, conversion, and utilization. These technologies include databases, document management systems, enterprise social networking platforms, and collaboration tools.

One key aspect of KM is knowledge acquisition/creation, which refers to the process of acquiring new knowledge or creating it within the organization. This can be achieved through various means, such as training programs, mentorship, and knowledge sharing sessions. ICTs can play a crucial role in this process by providing platforms for employees to share their knowledge and expertise, and by providing access to online training resources and other learning materials. Data mining is a powerful tool that can be used in knowledge management (KM) implementations to acquire, create, disseminate, convert, and utilize knowledge.(Zekić-Sušac & Has, 2015) KM is the process of creating, sharing, using, and managing the knowledge and information of an organization. It is driven by the use of information and communication technologies (ICTs) that assist with these activities.

There are two main methods of KM: traditional and advanced. Traditional KM methods rely on manual processes such as meetings, workshops, and document sharing to acquire, create, disseminate, and utilize knowledge. These methods can be effective, but they can be time-consuming and may not be suitable for organizations with large amounts of data.

Advanced KM methods, on the other hand, use ICTs and data mining techniques to automate and optimize the KM process. Data mining is the process of using algorithms and statistical techniques to extract useful insights and patterns from large datasets. It can be used to analyze structured and unstructured data and identify trends, patterns, and relationships that may not be obvious to the human eye. (Sadath, 2013) Acquiring knowledge is a crucial part of the knowledge management process. It involves finding and collecting information that can be used to improve processes, make better decisions, and solve problems. Data mining is a powerful tool that can be used to acquire knowledge from large datasets and convert it into a usable form.

One way that organizations can use data mining to acquire knowledge is by analyzing customer feedback. Customer feedback can be a rich source of information about an organization's products, services, and processes. By using data mining techniques, organizations can extract insights and patterns from customer feedback data and identify common issues or complaints that need to be addressed.

For example, an organization might use data mining to analyze customer reviews and ratings of its products on an e-commerce platform. By identifying common themes and patterns in the feedback, the organization can identify areas where it needs to improve its products or customer service.

Data mining can also be used to acquire knowledge from other types of datasets, such as sales data, employee data, and social media data. By analyzing these datasets, organizations can identify trends and patterns that can be used to improve processes, make better decisions, and solve problems. (Folorunso & Ogunde, 2005) Creating knowledge is an important part of the knowledge management process. It involves using information and insights to generate new ideas and solutions to problems. Data mining is a powerful tool that can be used to create knowledge by identifying trends and patterns in data that can be used to generate new insights.

One way that organizations can use data mining to create knowledge is by analyzing sales data. By analyzing sales data, organizations can identify trends in customer behavior that can be used to improve marketing strategies. For example, an organization might use data mining to identify the most popular products or the times of year when sales are highest. This information can be used to create targeted marketing campaigns or to adjust inventory levels to meet demand. Data mining can also be used to create knowledge by identifying trends and patterns in other types of data, such as employee data, social media data, or customer feedback data. By analyzing these datasets, organizations can generate new insights that can be used to improve processes, make better decisions, and solve problems. Disseminating knowledge is an important part of the knowledge management process. It involves sharing information and insights with stakeholders in an organization in a way that is easy to

understand and use. (Moayer & Gardner, 2012) Data mining is a powerful tool that can be used to disseminate knowledge by identifying key insights and trends that can be shared with stakeholders.

Data mining to disseminate knowledge is by identifying best practices that can be shared with employees. By analyzing data on employee performance, an organization can identify trends and patterns that can be used to develop training programs or processes that will improve employee performance. For example, an organization might use data mining to identify the most effective methods for training employees or the factors that contribute to high employee retention rates. This information can be shared with employees to help them improve their performance and contribute to the overall success of the organization.

Data mining can also be used to disseminate knowledge by identifying trends and patterns in other types of data, such as sales data, customer feedback data, or social media data. By analyzing these datasets, organizations can identify key insights and trends that can be shared with stakeholders to help them make better decisions or solve problems. Converting knowledge is an important part of the knowledge management process. It involves taking information that is in one form and converting it into a form that is more usable or understandable. Data mining is a powerful tool that can be used to convert knowledge by extracting insights and patterns from large datasets and converting them into a usable form.

organisations can use data mining to convert knowledge by converting data from unstructured sources into structured data. Unstructured data is information that is not organized in a predetermined way, such as customer feedback, social media posts, or emails. This type of data can be difficult to analyze and extract useful insights from. By using data mining techniques, organizations can convert unstructured data into structured data that can be easily analyzed and used to improve processes.

For example, an organization might use data mining to analyze customer feedback data and extract insights about common issues or complaints. (Wu, Lee, Tseng, & Chiang, 2010) By converting this data into a structured form, the organization can easily identify trends and patterns in the feedback and use this information to improve its products or customer service.

Data mining can also be used to convert knowledge by extracting insights and patterns from structured data. By analyzing structured data, organizations can identify trends and patterns that can be used to improve processes, make better decisions, and solve problems. Utilizing knowledge is an important part of the knowledge management process. It involves using the knowledge and insights that have been acquired, created, disseminated, and converted to make better decisions and solve problems. Data mining is a powerful tool that can be used to identify the most useful knowledge for a particular task or decision.

One way that organizations can use data mining to utilize knowledge is by identifying the most relevant knowledge for a particular problem or challenge faced by the organization. By analyzing data on past problems or challenges, an organization can identify trends and patterns that can be used to inform future decision-making. For example, an organization might use data mining to identify the most effective strategies for addressing a particular customer issue or the factors that contribute to high employee retention rates.

Data mining can also be used to identify the most useful knowledge for a particular task or decision by analyzing data on past successes and failures. By analyzing data on past projects, an organization can identify the factors that contributed to success or failure and use this information to inform future decision-making.

Objective

1. To explore Data Mining Application in Effective Knowledge Management.
2. To know the importance of Data Mining Application in Effective Knowledge Management.

Methodology

In the present study 195 people from different occupational sectors were surveyed to explore Data Mining Application in Effective Knowledge Management. The survey was conducted with the help of a structured questionnaire. The researcher had collected the primary data through random sampling method. Data was analysed and evaluated by mean and t-test.

Findings

Table below is sharing general details of the respondents in which among 195 respondents 67.7% are male and rest 32.3% are female. 32.3% of the respondents are below 40 years of age, 47.2% are between 40-45 years of age and rest 20.5% are above 45 years of age. 35.4% of the respondents are working in IT sector, 28.2% from the healthcare sector, 26.1% are working in retail sector and rest 7.7% are from other occupational sector where Data mining applications are in knowledge management.

Table 1 General Details

Variables	Respondents	Percentage
Gender		
Male	132	67.7
Female	63	32.3
Total	195	100
Age (years)		
Below 40	63	32.3
40-45	92	47.2
Above 45	40	20.5

Total	195	100
Occupational Sector		
IT	69	35.4
Health care	55	28.2
Retail	51	26.1
Others	15	7.7
Total	195	100

Table 2 Data Mining Application in Effective Knowledge Management

S. No.	Statements	Mean value	t value	Sig.
1.	Data mining applications help to extract useful information from large data sets	3.12	1.705	0.045
2.	Data mining application support decision making process	3.19	2.717	0.004
3.	DM applications identify patterns and relationships hidden within the data	3.17	2.470	0.007
4.	DM applications help to identify patterns of customer purchasing habits	3.13	1.850	0.033
5.	DM applications analyse data on patient records and help in personalized treatment plans	3.16	2.315	0.011
6.	DM extract insights and patterns from customer feedback data and identify common issues or complaints	3.20	2.845	0.002
7.	DM analyses sales data and identify trends in customer behaviour to improve marketing strategies	3.14	2.010	0.023
8.	DM analyses data on employee performance and help to develop training programs or processes	3.10	1.442	0.075
9.	DM convert unstructured data into structured data that can be easily analysed and used to improve processes	3.21	2.992	0.002
10.	DM analyses data on past projects and help in future decision-making	3.15	2.175	0.015

Table above is showing Data Mining Application in Effective Knowledge Management in which it is found that the respondent says, Data Mining applications convert unstructured data into structured data that can be easily analysed and used to improve processes with the mean value 3.21, DM extract insights and patterns from customer feedback data and identify common issues or complaints with mean value 3.20 and Data mining application support decision making process with mean value 3.19. The table also shows that DM applications identify patterns and relationships hidden within the data with the mean value 3.17, DM applications analyse data on patient records and help in personalized treatment plans with the mean value 3.16 and DM analyses data on past projects and help in future decision-making

with the mean value 3.15. The respondent also shares that DM analyses sales data and identify trends in customer behaviour to improve marketing strategies with the mean value 3.14, DM applications help to identify patterns of customer purchasing habits with the mean value 3.13, Data mining applications help to extract useful information from large data sets with the mean value 3.12 and DM analyses data on employee performance and help to develop training programs or processes with the mean value 3.10. Further t-test shows that all the statements are significant (with the value below 0.05) except *DM analyses data on employee performance and help to develop training programs or processes* (significance value 0.075).

CONCLUSION

In conclusion, data mining is a powerful tool that can be used in knowledge management (KM) to acquire, create, disseminate, convert, and utilize knowledge. KM is the process of creating, sharing, using, and managing the knowledge and information of an organization. Data mining involves using algorithms and statistical techniques to extract useful insights and patterns from large datasets. By using data mining techniques, organizations can make more informed decisions and solve problems more effectively.

Data mining can be used to acquire knowledge by extracting it from large datasets and converting it into a usable form. It can be used to create knowledge by identifying trends and patterns in data that can be used to generate new insights. Data mining can also be used to disseminate knowledge by identifying key insights and trends that can be shared with stakeholders in an organization. It can be used to convert knowledge by extracting insights and patterns from large datasets and converting them into a usable form. And it can be used to utilize knowledge by identifying the most relevant knowledge for a particular task or decision.

The study explores Data Mining Application in Effective Knowledge Management and found that Data Mining applications convert unstructured data into structured data that can be easily analysed and used to improve processes, extract insights and patterns from customer feedback data and identify common issues or complaints, support decision making process, DM applications identify patterns and relationships hidden within the data and analyse data on patient records and help in personalized treatment plans. The study concludes that there is a significant importance of Data Mining Application in Effective Knowledge Management.

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